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WORK PLAN FOR INVENTORY, HAZARDOUS CATEGORIZATION AND SEGREGATION OF SOUTHWEST TRENCHES REMOVAL ACTION LAB WASTE

for the:

LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR)
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA

Prepared for:

United States Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, California 95612-5208

Prepared by:

Weiss Associates
5801 Christie Avenue, Suite 600
Emeryville, CA 94608

December 10, 1999
Rev. 0

DOE Oakland Operations Contract DE-AC03-96SF20686

Weiss Associates
Environmental Science, Engineering and Management

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Approvals Page

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Approved by: Mary Stallard Date: 12-10-99
Mary Stallard, C.E.G.
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Weiss Associates

Approved by: Robert O. Devany Date: 12-10-99
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Michael D. Dresen, C.E.G., C.H.G.
Program Manager
Weiss Associates

CONTENTS

TABLE

ATTACHMENTS

ACRONYMS

AHA	Activity Hazard Analysis
ALARA	As Low As Reasonably Achievable
CA	Contamination area
CEDE	Committed Effective Dose Equivalent
CFR	Code of Federal Regulations
CPGERP	Contingency Plan and General Emergency Response Procedures
DOE	United States Department of Energy
dpm/cm^2	disintegrations per minute/centimeter squared
EMS	Environmental Management Services
EPA	United States Environmental Protection Agency
ER/WM	Environmental Restoration/Waste Management
GM	Geiger-Müeller
HEPA	High-efficiency particulate air
HSP	Health and Safety Procedure
HWP	Hazardous Work Permit
IT	IT Corporation
LEHR	Laboratory for Energy-Related Health Research
LSC	Liquid Scintillation Counter
MSDS	Material Safety Data Sheet
PHSP	Project Health and Safety Plan
PID	Photo-ionization detector
PPE	Personal protective equipment
PQAS	Project Quality Assurance Specialist
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RA	Removal Action

Ra-226	Radium-226
RCT	Radiological Control Technician
RPP	Radiation Protection Program
RSO	Radiation Safety Officer
SC	Site Coordinator
SHSO	Site Health and Safety Officer
SOP	Standard Operating Procedure
SQP	Standard Quality Procedure
Sr-90	Strontium-90
TL	Task Leader
UCD	University of California, Davis
VOC	Volatile organic compound
WA	Weiss Associates
WMP	Waste Management Plan
µCi	Microcurie

1. INTRODUCTION

This work plan presents the approach and procedures for determining the hazard category for unknown or uncharacterized wastes segregated from the 1998 Southwest Trenches Removal Action. This work plan includes descriptions and rationale for the planned activities, detailed procedures for all field work, quality assurance/quality control (QA/QC), health and safety, and waste management.

The objective of this work plan is to initially identify potential waste streams by categorizing the materials according to hazardous characteristics. This will define the detailed waste characterization required to gain waste acceptance for disposal.

1.1 Work Plan Organization

Section 2 of this work plan presents the objectives for the hazardous categorization activities. Sections 3, 4, and 5 detail the processes for conducting this work. Section 6 describes the waste management procedures. Section 7 summarizes Health and Safety requirements, and Section 8 describes applicable Quality Assurance guidance. Cited references are listed in Section 9.

2. OBJECTIVES

The primary objective of this activity is to initially identify waste materials by chemical type and/or hazardous category. Chemical type and hazardous category data will be generated using the HAZCAT® Chemical Identification System (HAZTECH, 1995). This information will be used to segregate the waste into compatible categories and to develop a bulking and sampling plan to facilitate disposal characterization. The results of this activity will also be used to identify the health and safety requirements applicable to future waste management activities.

2.1 Schedule

The schedule for all phases of work associated with this task is summarized in Table 1.

Table 1. Southwest Trenches Laboratory Waste Inventory, Hazardous Categorization and Segregation Schedule and Proposed Bulking and Sampling Schedule

Sub-task Description	Completion Date
Generate Draft Work Plan	11-15-99
Generate Draft HWP	11-15-99
Finalize HWP	12-10-99
Finalize Work Plan	12-10-99
Implement Work Plan	12-13-99
Consolidate Data	12-20-99
Complete Draft Bulking and Sampling Plan	1-14-00
Finalize Bulking and Sampling Plan	1-28-00
Implement Bulking and Sampling Plan	2-14-00

3. RESPONSIBILITIES

3.1 Responsibilities

The responsibilities of the three companies conducting the activities under this work plan are briefly summarized below.

Weiss Associates (WA) – Weiss Associates responsibilities include overall management and oversight, on-site Health and Safety oversight, on-site task coordination, and updating the waste tracking system.

International Technology Corporation (IT) – IT will be responsible for providing all required on-site radiological support including completion of waste tracking container logs. In addition, IT will provide a chemist to assist and consult during HAZCAT® activities.

Environmental Management Services, Inc. (EMS) – EMS will be responsible for providing the expertise and personnel to carry out the HAZCAT® operations, and will serve as the point of contact for all waste management issues.

3.2 HAZCAT® Task Staff

General responsibilities for listed personnel are detailed in the PHSP. Task-specific personnel and associated responsibilities are described below:

- Project Manager (PM) – Bob Devany - WA
- Project Health and Safety Manager (PHSM) – Jerry McHugh, CIH – WA
- Radiation Control Manager (RCM) – Jerry McHugh, CIH – WA
- Task Leader (TL)/Site Coordinator (SC) – John Wolf – WA
- HAZCAT® Technician – Dawn Mitchell – EMS
- Site Health and Safety Officer (SHSO) – Kim Warren – WA
- Radiation Safety Officer (RSO) – Dave Ochs – IT

- Chemist – Steve Bule – IT
- Radiation Control Technician (RCT) – Paul Fletcher – IT

The responsibilities of the aforementioned staff are detailed in the Project Health and Safety Plan (PHSP) (WA, 1998a).

4. PROCEDURE

The procedures that will be used to conduct the inventory, hazardous categorization and segregation of Southwest Trenches lab waste are described below.

4.1 Work Area Preparation

This section describes the steps necessary to establish the work area and dismantle it after the HAZCAT® task is completed. These steps include set-up and inspection of the fume hood and post-work decontamination of the fume hood and work area as required.

The work area will be established in the Geriatrics-I building (Building H-292) where the waste is currently stored.

4.1.1 Materials, Equipment, Tools

Materials, equipment, and tools required to complete the scope of work may include, but are not limited to, the following:

- Waste packages (bags, drums, etc.);
- Hand tools;
- Herculite or polyethylene sheeting;
- Health physics supplies;
- Radiological instrumentation;
- Industrial hygiene monitoring equipment;
- Photography equipment and supplies;
- Personal Protection Equipment (PPE);
- HAZCAT® kit;
- Fume hood;
- High-efficiency particulate air (HEPA) vacuum; and,
- HEPA ventilation system.

4.1.2 Work Area Set-up

An area within Geriatrics I, clear of obstructions and stored items, will be established as a Contamination Area (CA). This area should be large enough to accommodate the:

- Fume hood;
- Waste containers (19 poly buckets and one 55-gallon drum);
- HAZCAT® Technician;
- Chemist;
- RCT; and,
- HAZCAT® reagent staging area.

HAZCAT® reagents will be stored and staged as detailed in the HAZCAT® Users Manual (HAZTECH, 1995). The floor area will be covered with a non-permeable material (Herculite™, poly sheeting or equivalent). The limits of the work area will be defined using stanchions and yellow and magenta rope or ribbon. A single point of access and egress shall be established with a step-off pad.

4.1.3 Fume Hood Set-up and Inspection

The procedures for the fume hood setup and inspection are:

- Locate the fume hood in the work area at a comfortable work height. Connect the HEPA filter and air mover to the exhaust of the fume hood. Verify that the fume hood has adequate interior lighting.
- Visually inspect the fume hood for structural integrity, physical damage, sharp edges, protruding fasteners and any other obstructions that could catch or snag equipment or protective clothing. Inspect any electrical wiring and connectors for cuts, abrasions, missing poles or any damage. Inspect viewing windows for cracks, loose or missing panes, cleanliness, obstructions or other impairments to a clear view of the interior.
- Inspect and verify the operability and integrity of any pass-through ports for inserting or removing materials.
- Operate the air mover and verify by installed gauge(s) and/or with smoke tubes that a negative pressure atmosphere is established inside the fume hood.
- Inspect the HEPA filter assembly for integrity and verify filter efficiency prior to use (DOP test or equivalent).

4.1.4 Dry Run

Conduct a dry run of the planned activities as detailed in Section 4.3 *Hazard Categorization,* using clean materials and pails to ensure that the work area is adequate and the fume hood functions properly. Make any adjustments and correct any problems identified during the dry run. Repeat the dry run process as needed to ensure that the fume hood and work area will support the planned activities.

4.2 Visual Inventory/Inspection/Survey

Prior to commencing categorization of the substances in the poly-buckets and 55-gallon drum, a visual inspection/inventory and radiological survey will be conducted. The RCT will survey the lid, package and waste items as described in Standard Operating Procedure (SOP) 25.1 – Radiological Surveys and Instrumentation. This step is to ensure that the task can be performed in an efficient manner, such that buckets can be tested in the appropriate order based on physical characteristics, radiological conditions, or other apparent chemical features. If radiological conditions warrant and bucket size allows, the buckets should be opened within the confines of the fume hood. When packages are of sufficient size that they cannot be safely passed into the fume hood, the packages will be opened near the HEPA ventilation system inlet to ensure that potential exposure to potential airborne radioactive contamination is minimized. Waste tracking sheets are included as Attachment 1.

Data collected during the inventory and inspection will include:

- Container size, type and integrity;
- Description and quantity of materials;
- Photographic record;
- Radiological survey data; and,
- Other pertinent information.

4.3 Hazardous Categorization Process

Based on the physical inventory and radiological screening, the material will be organized so that the material with the highest radiological hazard and containers with the potential for leakage shall be categorized last; thereby reducing any radiological exposure, cross contamination and contamination of the work area in the fume hood. All the empty containers will be grouped together and set aside.

Based on visual inspection, the HAZCAT® tech will identify which tests shall be required following the HAZCAT® Chemical Identification System and associated manual. Any labels and

other discernable information will be used to reduce the number of tests that will be run on each sample. Attachments 2 and 3 show the steps and tests that comprise the standard HAZCAT® process for chemical identification and will serve as the foundation for this activity. If the substance is suspected to contain blood, additional testing will be performed using the Leuco-Malachite Dischaps® Test to verify that the substance is blood (ACE, 1999).

For each container/group of containers that are tested, a Hazardous Waste Profile form will be completed. See Attachment 4 for an example Hazardous Waste Profile Form.

4.4 Radiological Controls

All work is to be performed in accordance with an approved Hazardous Work Permit (HWP). A RCT will obtain a dose rate from each waste package prior to transfer into the work area. Waste packages will not be opened until they are inside the fume hood unless package size is prohibitive. When packages are of a size that cannot be safely passed into the fume hood, the packages will be opened near the HEPA ventilation system inlet to ensure that potential exposure to potential airborne radioactive contamination is minimized. Conduct of this activity will be in accordance with the Radiological Protection Program (RPP) (WA, 1999a) and specifically with the following SOPs and Health and Safety Procedures (HSPs):

SOP 25.1 – Radiological Surveys and Instrumentation

SOP 32.1 – Contamination Control

HSP 15.1 – External Radiation Exposure Control

HSP 17.1 – Hazardous Work Permits

All materials removed from the fume hood will be bagged. Each bag of material will be monitored for radioactive contamination and exposure rate, and tagged. Bags that have loose external contamination above established limits shall be wiped down or double bagged to prevent the spread of contamination.

Tags shall include a description of the contents, a unique identification number, the dose rate, loose contamination levels on inner and outer packaging as applicable, time and date of packaging, and the signature of the RCT. All wastes generated will be managed in accordance with Section 6, *Waste Management*, of this work plan.

5. WORK AREA DISMANTLEMENT

After HAZCAT® activities are complete, the fume hood will be decontaminated, dismantled as necessary to return it to storage, and the work area will be decontaminated and dismantled in accordance with the following sections. Conduct of this activity will be in accordance with the RPP, specifically SOP 32.1 - Contamination Control.

5.1 Fume Hood

Remove all tools and materials from the fume hood. The interior of the fume hood will be wiped down using disposable wipes wetted with Simple Green™ or other approved cleaner. This will be conducted with the fume hood ventilation system in operation and using similar controls as used during the performance of the work.

During conduct of the HAZCAT® procedure, if any reagents are spilled, they will be wiped up immediately to prevent chemical contamination of the fume hood. The fume hood will be assumed chemically clean if this real-time decontamination is accomplished.

A smear survey of the interior of the fume hood will be performed to document the radiological conditions.

The decontamination and survey efforts will be repeated as necessary to return the interior of the fume hood to its original condition. In general, removable contamination levels should be less than 20 dpm/100 cm^2 for alpha, and less than 200 dpm/100 cm^2 for beta-gamma.

Once the interior of the fume hood has been decontaminated to acceptable levels as defined in SOP 32.1 - Contamination Control, secure the HEPA filter system and remove all sources of power to the fume hood. Disconnect the HEPA filter system, and seal the connections. Seal all penetrations in the fume hood.

Decontaminate the exterior of the fume hood as required to achieve loose contamination levels below the established release limits. Remove the fume hood from the work area. If the fume hood cannot be decontaminated to release limits, package the fume hood to prevent the spread or release of contamination and transfer it to an established radioactive material storage location. Package and store the HEPA filter system in the same manner.

5.2 Work Area

Package and remove all equipment or waste items remaining in the work area, in accordance with the HWP and Section 6, *Waste Management*, of this work plan.

Fold the material used to protect the floor into the center and package for disposal.

Conduct a radiological survey of the work area and decontaminate any area that does not meet release criteria. Once the area has been determined to meet the release criteria, remove the postings and physical boundaries.

6. WASTE MANAGEMENT

The LEHR Waste Management Plan (WA, 1999b) outlines the appropriate process or expected lifecycle for all types of potential waste streams anticipated to be managed on site. The objectives of this work plan are in support of appropriate handling, storage, sampling, and disposal of the wastes categorized via this task. Upon the completion of the task outlined in this work plan, the project team will be able to manage the subject wastes in the most safe, efficient, cost-effective, and compliant manner possible.

6.1 Waste Minimization

The LEHR Waste Management Program is committed to minimizing waste volumes at the LEHR Site by giving preference to source reduction, material substitution, decontamination, and recycling. Whenever possible, materials will be radiologically surveyed and released for disposal at a permitted disposal facility as non-radioactive waste. In addition, whenever possible, only small quantities of waste material and HAZCAT® reagents will be used for hazardous characterization, thereby minimizing the generation of secondary waste.

6.2 Task-Specific Guidance

Upon completion of categorization of each substance, all secondary wastes (empty vials, bottles, syringes, analytical supplies, PPE, etc.) will be maintained/stored in a waste package with the original substance pending eventual bulking and analytical results. All empty containers, secondary wastes, and characterized substances will be managed in accordance with all applicable United States Environmental Protection Agency (EPA), California EPA, and Department of Energy (DOE) requirements based on analytical results. All newly segregated waste streams shall be managed in accordance with the LEHR waste tracking system procedures.

Specifically, the RCT will complete waste tracking system container logs. Container logs and radiological surveys will be forwarded to the site waste coordinator for incorporation into the LEHR waste tracking system database.

7. HEALTH AND SAFETY CONSIDERATIONS

Health and safety considerations for the activities outlined in this work plan are addressed by the following documents: PHSP (WA, 1998a), HSPs (WA, 1998b), SOPs (WA, 1998c), the Contingency Plan and Emergency Response Procedures (CPGERP) (WA, 1998d), the As Low As Reasonably Achievable (ALARA) Program; (WA, 1999c), and the RPP; (WA, 1999a). The health and safety considerations presented in this section of this work plan coupled with the foregoing listed documents, represent the safety and health program required by 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* and 10 CFR 835, *Occupational Radiation Protection*, for these work activities.

7.1 Activity Hazard Analysis

An Activity Hazard Analysis (AHA) identifies potential safety, health and environmental hazards and provides for the protection of personnel. Hazard analysis helps ensure that all sampling and waste handling safety concerns are met. An AHA describing hazard analysis and controls related to activities covered by this work plan is presented as Attachment 5.

During these activities, the SHSO or designee, will monitor activities for any changes in conditions that would require modification of conditions (e.g., PPE). In the event that changes arise in radiological or industrial health and safety conditions that are not covered by this work plan or referenced documents, this work plan will be modified in accordance with the procedures contained in Standard Quality Procedure (SQP) 11.1, Fieldwork Variances/ Request for Information (WA, 1998e).

7.1.1 Radiological Exposure

The excavated wastes and materials contain low-levels of radioactive material from prior animal research activities. The predominant radionuclides used during these activities were Ra-226, Sr-90, Cs-137, and tritium. During waste segregation and packaging activities in support of the Southwest Trenches Removal Action, there was indication of tritium contamination in one of the poly-buckets to be categorized (~7 μCi/swipe).

Waste/sample handling and packaging may present exposure to radioactive materials through contact, ingestion, and inhalation. Exposure rates and contamination levels will be monitored and controlled by the RCT in accordance with the RPP and the following procedures:

- SOP 24.1 – Radiological Areas and Postings
- SOP 25.1 – Radiological Surveys and Instrumentation
- SOP 32.1 – Contamination Control
- SOP 37.1 – Tennelec Series 5 Low Background Counting System
- SOP 37.2 – Liquid Scintillation Counter (LSC)
- HSP 14.1 – Airborne Radioactivity Monitoring
- HSP 15.1 – External Radiation Control
- HSP 17.1 – Hazardous Work Permits

Personnel radiological exposure will be maintained ALARA by employing all appropriate engineering and administrative controls. The use of the fume hood with HEPA ventilation, an independent HEPA ventilation unit, and appropriate PPE will serve as the major engineering controls. Administrative controls to be used consist of the HWP, personnel training, and adherence to all site procedures and postings.

Personnel will wear Modified Level D PPE as defined in the PHSP and as specified on the HWP. The level of PPE will be modified and the HWP will be revised if radiological conditions exceed anticipated levels.

ALARA guidelines for this activity are included as Attachment 6.

7.1.2 Chemical Exposure

The waste materials to be handled may contain hazardous chemicals. Due to the lack of analytical data and the nature of the HAZCAT® process, the activities will be carried out with the physical barrier provided by the HEPA filtered fume hood to prevent contact with the substances being handled, and to contain any reactions that may occur.

If waste packages must be opened outside the fume hood, real time air monitoring will be performed in the breathing zone for volatile organic compounds (VOCs). Ingestion of chemicals will be minimized by use of proper PPE and personal hygiene. Administrative and engineering controls will be used to reduce potential exposure to chemicals. Should airborne concentrations exceed action levels stated in Section 7.2.10 of this work plan, additional engineering controls will be implemented if feasible before considering the use of additional PPE.

7.1.3 Heat Stress

Due to the scheduled time for completion of this task (December) in relation to the corresponding seasonal climate, risk of heat stress is not anticipated.

7.2 Hazard Controls

The following control measures will be implemented during the execution of this work plan, and will supplement the PHSP.

7.2.1 Hazardous Work Permit

HWPs will be used to control work in the work area. A HWP will be issued in accordance with the procedures specified in the PHSP. The following information will be described or referenced in the HWP:

- Scope of work to be performed;
- Anticipated radiological, safety, and industrial hygiene conditions;
- PPE and respiratory protection requirements;
- Radiological and industrial hygiene monitoring requirements;
- Dosimetry requirements;
- Work plan and/or AHA;
- Period for which the HWP is valid; and,
- Additional requirements for entry.

7.2.2 Boundaries

The work area will be enclosed by boundary ropes or ribbons supported with stanchions. The placement of the stanchions and boundaries will be planned by the TL/SC to facilitate access to the work area for equipment. The boundaries will be set up and signs posted in accordance with the PHSP and the RPP.

7.2.3 Personal Protective Equipment

Employees will wear modified Level D PPE in accordance with the PPE selection matrix in Section 9 of the PHSP. RCTs and the SHSO will collect air-monitoring data during conduct of the activity. The task-specific level of protection will be upgraded or downgraded based on the measurements of direct reading instruments compared to action levels, a change in site conditions or other findings. Changes in the level of protection require approval by the PHSM, or designee.

Modified Level D PPE will consist of the following when specified in the HWP:

- Steel-toed shoes;
- Chemical resistant outer and inner boot covers;
- Tyvek coveralls;
- Safety glasses with side shields;
- Chemical resistant inner and outer gloves; and
- Full tape of wrists, ankles and zipper.

7.2.4 Decontamination Procedures

Decontamination procedures will be conducted in accordance with Section 10 of the PHSP for personnel decontamination, equipment decontamination and PPE decontamination, and with HSP 18.1 – Personal Contamination (Update No.1). When performing radiological work, workers will perform personal monitoring with the guidance of a RCT. All equipment/materials will be monitored and handled/packaged in accordance with the RPP before being removed from any contamination area.

7.2.5 Training

Personnel performing activities associated with this activity will receive training covering this plan and with HSP 20.1 – Worker Safety and Radiation Protection Training, Rev 0 (Update 1). Minimum training requirements will be specified on the HWP. The SHSO and RSO will ensure that all personnel are trained in accordance with the PHSP and RPP as appropriate. In addition, workers performing the HAZCAT® testing will read and have a thorough understanding of Material Safety Data Sheets (MSDS) for all reagents to be used in the task.

7.2.6 Buddy System

The buddy system will be utilized to protect personnel in the work area. At least two persons will be required to be in the work area when work is conducted in the contamination area.

The buddy system is a method of organizing employees into work groups and is designed to provide those employees with assistance when needed. Each employee in a work group is designated to be observed by at least one other person. Assignment of designated partners should take place during the daily tailgate safety meeting.

The responsibility of the buddy is to:

- Provide assistance, if needed;
- Maintain line-of-sight contact or verbal contact with workers in the CA;
- Observe for signs of chemical or physical trauma or heat stress such as:
  - changes in complexion and skin discoloration;
  - changes in coordination or demeanor;
  - excessive saliva and pupillary response; or,
  - changes in speech pattern;
- Periodically verify the integrity of all protective clothing; and,
- Notify the TL/SC if emergency help is needed.

7.2.7 Safety Equipment

In addition to other equipment specified in this work plan, the following safety equipment will be staged at the boundary of the CA:

- First aid kit;
- Portable eyewash station and hand shower;
- Air horn;
- Portable radio for emergency communications; and,
- Fire extinguisher.

7.2.8 HEPA Ventilation System

A HEPA ventilation system will be used during this activity, specifically when waste packages are of a size that cannot be safely passed into the fume hood and must be opened in the controlled work area. Site HEPA ventilation units are rated to filter up to 2,000 cubic feet per minute. The HEPA unit will be operated by site RCTs under the supervision of the RSO. The HEPA unit will be placed in a location that will draw potential airborne contaminants away from personnel, through the HEPA filters, and exhausted outside the building. The ventilation units will be positioned to effectively capture potential contaminants while ensuring that the ventilation rate is

neither excessive nor capable of capturing unwanted items in the ventilation ductwork. Smoke tubes or other airflow devices will be utilized to ensure that the HEPA filtration units are appropriately positioned and providing the necessary capture velocity.

7.2.9 Spill Containment

In addition to the mitigation measures presented in this work plan, a spill and discharge control plan has been prepared to provide contingency measures for potential spills and discharges from handling and movement of potentially hazardous wastes. This spill and discharge control plan is in the PHSP and the CPGERP.

7.2.10 Air Monitoring

Air monitoring is essential to ensure that all field personnel will be adequately protected from airborne contaminants. Air monitoring will be conducted in accordance with HSP 6.1 – Air Monitoring, HSP 14.1 – Airborne Radioactivity Monitoring and Section 11 of the PHSP.

General area radiological air monitoring locations will be near/in the work area having the highest potential for generating airborne radioactive contaminants.

All personal integrated air monitoring samples and direct instrumentation readings taken for the purpose of determining appropriate H&S precautions shall be collected/ taken in the approximate "breathing zone" of site personnel and integrated over an appropriate time interval. As appropriate, selective monitoring of high-risk workers will be conducted.

7.2.11 Site Emergencies

All site workers shall be trained on the procedures outlined in the CPGERP for responding to potential incidents. The SHSO will ensure that all appropriate emergency equipment is available and review evacuation procedures with workers.

8. QUALITY ASSURANCE

This section presents the QA/QC issues related to the scope of work described in this document. The objective of this section is to provide a framework to ensure that quality is integrated within every aspect of the project work.

Personnel involved in conducting or supervising the work described in this work plan are responsible for certifying that they have been instructed in applicable sections of the work plan, including health and safety, as may affect their work. This certification will be obtained, documented and filed for each effected worker by the TL, or designee, in accordance with the requirement outlined in the Quality Assurance Project Plan (QAPP) (WA, 1998f).

Other quality assurance requirements applicable to this task are detailed in the QAPP for the environmental restoration activities at the LEHR site (WA, 1998f).

9. REFERENCES

ACE Fingerprint Equipment Laboratories, 1999, Leuco-Malachite Dischaps® Testing Procedure, Wake Forrest, North California.

HAZTECH Systems, Inc., 1995, HAZCAT® Chemical Identification System Users Manual, San Francisco, California.

Weiss Associates, 1998a, Project Health and Safety Plan for Environmental Restoration/Waste Management, LEHR, UC Davis, California.

Weiss Associates, 1998b, Final Health and Safety Procedures, LEHR, UC Davis, California.

Weiss Associates, 1998c, Final Standard Operating Procedures, LEHR, UC Davis, California.

Weiss Associates, 1998d, Contingency Plan and General Emergency Response Procedures, LEHR, UC Davis, California.

Weiss Associates, 1998e, Standard Quality Procedures for Environmental Restoration/Waste Management, LEHR, UC Davis, California.

Weiss Associates, 1998f, Quality Assurance Project Plan for Environmental Restoration/Waste Management, LEHR, UC Davis, California.

Weiss Associates, 1999a, Final Radiological Protection Program, Rev. 2, LEHR, UC Davis, California.

Weiss Associates, 1999b, Draft Final Waste Management Plan for Removal Actions in the Southwest Trenches, Ra/Sr Treatment Systems, and Domestic Septic Systems Areas, Rev. F, LEHR, UC Davis, California.

Weiss Associates, 1999c, Final As Low As Reasonably Achievable (ALARA) Program, LEHR, UC Davis, California.

ATTACHMENT 1

WASTE TRACKING SHEETS

Package No:	LEHR 0230
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Lab Glass (flask) 1/2 full of liquid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	6/23/98
Origin of Waste:	Southwest Trenches (S-14, W-4)
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	6/23/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 44
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0231
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	2 plastic vials full of liquid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/20/98
Origin of Waste:	Southwest Trenches (S-12, W-5.5; @ 3-6')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/20/98
Accumulation Start Date:	
Extemal Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 45
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0232
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Plastic ampoules full of dry material and liquid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/21/98
Origin of Waste:	Southwest Trenches (S-2.5, W-12; @ 3-6')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/21/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 46
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0233
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	1 gal glass jar 1/4 full of clear liquid. Associated with soil/gravel in box #RC-9700-585
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/21/98
Origin of Waste:	Southwest Trenches (S-2.5, W-12; @ 3-6')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/21/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 47
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0234
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	I gal glass jar 1/2 full. "Nitric Acid"
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/21/98
Origin of Waste:	Southwest Trenches (S-2.5, W-12)
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/21/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 48
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0235
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	1 gal glass jar full of yellow liquid.
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/21/98
Origin of Waste:	Southwest Trenches (S-2.5, W-12; @ 3-6')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/21/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 49
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0236
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	8 oz glass jar (broken)
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	072398-007
Date waste was generated:	7/23/98
Origin of Waste:	Southwest Trenches (S-10, W-8; @ 6-9')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	7/23/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 51
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0237
Package Type:	4 gal plastic bucket
DOT Container Type:	STC
Waste Description:	small bag of sludge
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/7/98
Origin of Waste:	Southwest Trenches (S-4, W-13)
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/7/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 52
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0238
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Syringe 1/3 full of liquid, small bottle 1/3 full of liquid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/7/98
Origin of Waste:	Southwest Trenches (S-10, W-8; @ 6-8')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/7/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	RM 53
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0239
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	vials, ampoules full of dry material
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/11/98
Origin of Waste:	Southwest Trenches (S-9.5-12, W-8; @ 6-12')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/11/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0240
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	vials, ampoules full of dry and liquid material
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-9.5, W-8; @ 8-10')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/14/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0241
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Test tubes, glassware filled with liquid (blood??)
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-9.5-12, W-8; @ 6-12')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/14/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0242
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	2 - 500 ml amber bottles containing liquid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-9.5-12, W-8; @ 6-11')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/14/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0243
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	1 syringe and 1 vial with liquid (blood??)
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-9.5-12, W-8; @ 6-12')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/14/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0244
Package Type:	1 gal plastic bucket
DOT Container Type:	STC
Waste Description:	1 L Amber jar containing liquid (1-2 ml) no lid
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	081998-003
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-9.5-12, W-8; @ 6-10')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	8/14/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 8/20/98
Person Entering Form/Date:	Melina Bratton 8/24/98

Package No:	LEHR 0324
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Various liquid filled glass containers
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	0.5 mR/hr
Hot Spot (mrem):	
Survey No:	090398-003
Date waste was generated:	9/3/98
Origin of Waste:	Southwest Trenches (S-14, W-5.5; @ 3-7')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	9/3/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 9/10/98
Person Entering Form/Date:	Melina Bratton 9/11/98

Package No:	LEHR 0325
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Glass containers/labware
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	0.070 mR/hr
Hot Spot (mrem):	
Survey No:	090398-003
Date waste was generated:	9/3/98
Origin of Waste:	Southwest Trenches (S-14, W-5-6; @ 3-7')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	9/3/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 9/10/98
Person Entering Form/Date:	Melina Bratton 9/11/98

Package No:	LEHR 0326
Package Type:	5 gal plastic bucket
DOT Container Type:	STC
Waste Description:	Soil/white powder
Waste Designation:	TBD
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	1.2 mR/hr
Hot Spot (mrem):	
Survey No:	090398-003
Date waste was generated:	9/3/98
Origin of Waste:	Southwest Trenches (S-14, W-4; @ 5')
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics I
Date Sealed:	
Storage Start Date:	9/3/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	
Person Completing Form/Date:	Dave Ochs 9/10/98
Person Entering Form/Date:	Melina Bratton 9/11/98

Package No:	LEHR 0335
Package Type:	55 gal drum
DOT Container Type:	STC
Waste Description:	Glass bottles, vials, tubes containing liquids mixed in soil, > 10% debris
Waste Designation:	TBD - (Potentially impacted by chlordane)
Compatibility Review Results:	
Hazardous Waste Code:	
Max Dose Rate (mrem):	< 0.1 mR/hr
Hot Spot (mrem):	
Survey No:	090998-001
Date waste was generated:	8/14/98
Origin of Waste:	Southwest Trenches (S-11, W-8)
Waste Origination:	Non-LFI
Process Knowledge/History:	
Sample No(s):	
Laboratory:	
Storage Location:	Geriatrics
Date Sealed:	
Storage Start Date:	9/9/98
Accumulation Start Date:	
External Package Volume (ft3):	

Volume of Waste (ft3):	6
Total (container and waste) Weight (lb	
Internal Package Volume (ft3):	
Container Tare Weight (lbs):	
Pre-disposal Treatment Type:	
Treatment Date:	
Waste Storage Disposal Record No:	
Portfolio No:	
Shipment No:	
Bill of Lading No:	
Hazardous Waste Manifest No:	
Radioactive Wast Manifest No:	
Transportation Index:	
Waste Profile No:	
Shipped Date:	
Disposal Date:	
Disposal Location:	
Previous Package No:	
Notes:	Representative of contents in LEHR 0200, 0202 - 0205
Person Completing Form/Date:	Dave Ochs 9/10/98
Person Entering Form/Date:	Melina Bratton 9/11/98

ATTACHMENT 2

HAZCAT® CHEMICAL IDENTIFICATION SYSTEM LIQUID UNKNOWN CHART

ATTACHMENT 3

HAZCAT® CHEMICAL IDENTIFICATION SYSTEM SOLID UNKNOWN CHART

ATTACHMENT 4

HAZCAT® CHEMICAL IDENTIFICATION SYSTEM HAZARDOUS WASTE PROFILE FORM

ATTACHMENT 5

ACTIVITY HAZARD ANALYSIS

Work Plan Step	Associated Hazards	Hazard Controls
Task set-up/dismantlement	1. Radioactive contamination 2. Chemical exposure	1. All workers will comply with the approved HWP and a RCT will be present at all times. 2. All workers will comply with the approved HWP, use of fume hood, and workers must be familiar with all reagents being used.
HAZCAT® testing	1. Radioactive contamination 2. Chemical exposure 3. Working with fume hood	1. All workers will comply with the approved HWP, use of fume hood, and a RCT will be present at all times. 2. All workers will comply with the approved HWP, use of fume hood, and workers must be familiar with all reagents and potential reactions being used. 3. All workers using the fume hood will be trained in its operation and will participate in a dry run of activities to ensure that personnel are familiarized with dexterity limitations inherent with fume hood use.
Waste handling	1. Radioactive contamination 2. Chemical exposure	1. All workers will comply with the approved HWP, use of fume hood, and a RCT will be present at all times. 2. All workers will comply with the approved HWP, use of fume hood, and workers must be familiar with all reagents being used.

ATTACHMENT 6

ALARA GUIDELINES

ALARA GUIDELINES FOR INVENTORY, HAZARDOUS CATEGORIZATION AND SEGREGATION OF SOUTHWEST TRENCHES REMOVAL ACTION LAB WASTE

for the:

LABORATORY FOR ENERGY-RELATED HEALTH RESEARCH (LEHR)
UNIVERSITY OF CALIFORNIA AT DAVIS, CALIFORNIA

Prepared for:

United States Department of Energy
Oakland Operations Office
1301 Clay Street
Oakland, California 95612-5208

Prepared by:

Environmental Management Services, Inc.
3075 Citrus Circle, Ste. 175
Walnut Creek, CA 94598

December 10, 1999
Rev. 0

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Approvals Page

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Approved by: Mary Stallard Date: 12/10/99
Mary Stallard, C.E.G.
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Weiss Associates

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Jerry McHugh, P.E., C.I.H.
Radiological Control Manager
Weiss Associates

CONTENTS

1. INTRODUCTION

As-Low-As-Reasonably-Achievable (ALARA) consideration is required for work involving removal actions at LEHR in accordance with 10 CFR 835 and the LEHR ALARA Program. Specifically, these ALARA guidelines/practices pertain to performing inventory, photography, and hazardous categorization and segregation of various wastes removed during the Southwest Trenches Removal Action. These activities are detailed in the Work Plan for Inventory, Hazardous Categorization and Segregation of Southwest Trenches Removal Action Lab Waste. These ALARA guidelines/practices may benefit by change (addition, deletion, or revision) as the project planned activities progress. Change shall be approved by the Radiological Safety Officer (RSO) or Radiological Control Manager (RCM) and be appropriately documented. These guidelines/practices may apply to other tasks upon written direction of the RSO or RCM. These ALARA guidelines/practices are not necessarily inclusive of all procedures required for either worker protection or preservation of the environment.

2. GUIDELINES/PRACTICES

There is no anticipated significant known measurable dose (either external or internal) associated with the tasks required by this work plan. Therefore, a graded approach was made to evaluate and implement ALARA procedures. In accordance with the LEHR ALARA Program, every effort should be made to maintain doses to ALARA levels. Therefore, the following precautionary procedures should be implemented:

ADMINISTRATIVE CONTROLS

Training:

1. Each worker entering the exclusion zone shall be instructed on these ALARA provisions (either as on the job training or at a tailgate safety meeting).

2. Reinforcement of Rad Worker II training shall be periodically conducted during tailgate safety meetings and on the job instruction to demonstrate how ALARA can be achieved by use of appropriate work procedures and practices.

3. Workers shall be instructed in the proper use of tools and methods to limit the generation of dust and/or vapors.

4. Workers shall be instructed in methods of maintaining PPE integrity to reduce personal contamination, including methods to reduce likelihood of cuts (creating potential for contamination) from waste (sharps) and equipment.

5. Personnel shall be instructed on the proper means of egress from contaminated areas to reduce exposure and the possibility of spreading contamination.

6. Workers shall be advised of areas or surfaces that ~~are~~ known to contain appreciable levels of removable surface contamination above background.

7. New or revised ALARA guidelines/practices shall be added to this list as identified throughout the task. These changes shall be discussed during tailgate safety meetings with site workers.

8. A dry-run or mock-up shall be used whenever possible to ensure workers are familiar with equipment and to mitigate any potential problems without actually handling radiological material.

9. Material shall be radiologically screened prior to handling.

10. HAZCAT® test shall be selected and staged outside the glove box to reduce exposure time.

11. Work shall begin with the least contaminated area and finish with the most contaminated area when practical.

12. Workers shall be instructed on the purpose, intent, and proper operation of the HEPA filtration units as it applies to their task assignments.

All Personnel:

1. Workers shall follow all applicable project procedures, practices, and work plan instructions as advised by Radiological Control Technician (RCT), Radiological Safety Officer (RSO), Site Health and Safety Officer (SHSO), and Supervisory personnel.

2. Workers shall not follow procedures that are deemed non-ALARA by RCT, RSO, SHSO, or Supervisory personnel.

3. Workers shall optimize all work and operations to maintain dose at ALARA, when and where practical.

4. Workers shall not bring construction materials, tools, and equipment not required for work in the CA into the CA, where practical.

5. Workers or supervisors shall ensure equipment is operational and functional prior to bringing it in to the CA.

6. Workers shall maintain a distance between themselves and the work task if their duties do not require their immediate presence at the task site.

7. Workers shall follow protocols for personal decontamination, personal hygiene, and work zone controls to minimize exposures.

8. All waste handling shall be done in a safe, expedient and planned manner.

9. If a HEPA filter is required for a task, then the work should be discontinued if the HEPA filter fails.

10. The workers should avoid placement of their heads in the air flow pathway between the work and the HEPA filter.

Supervisors/Managers:

1. Supervisory personnel shall optimize all work and operations to maintain dose at ALARA, when and where practical.

2. Only workers that have a need to be within the CA (exclusion zone) shall be permitted to enter the CA (exclusion zone).

3. Supervisors shall attempt to eliminate any unnecessary work.

4. Supervisors shall ensure use of a trained work force, sequence tasks to reduce exposure, schedule work in an efficient manner, and identify/coordinate necessary resource requirements.

5. Any materials, tools, or equipment required for work in the CA shall be evaluated by a RCT for ease of decontamination prior to bringing this equipment into the CA.

6. Equipment shall not be knowingly exposed to contaminants that knowingly cannot be decontaminated without major personnel exposures.

7. When practical, extension tools shall be used to eliminate or minimize personnel entry into the CA.

8. Supervisors shall ensure equipment is operational and functional prior to bringing it in to dose exposures in the contamination area.

9. Workers shall be supervised and monitored to minimize exposure to airborne contamination.

ENGINEERING CONTROLS

1. All work areas, including lay down and waste storage areas, shall be chosen with ALARA considerations in mind.

2. Foot traffic patterns and pathways shall be chosen to minimize the potential spread of contamination and cross contamination.

3. Precautions shall be taken to prevent and mitigate any waste spills, especially to drainage pathways, and to prevent off-site release of airborne contaminants.

4. Air intakes shall be re-routed to minimize exposure to adjoining structures and personnel when practicable.

5. Work area shall be ventilated using a HEPA filtration system which is vented to the building exterior.

6. Direct contact with objects containing known and measurable radiological contamination shall be avoided by placement of barriers, such as plastic, between the workers and these objects when practical.

7. The smallest amount of material shall be used to evaluate the sample thus reducing waste and exposure.

8. Periodic visual checks (smoke test or equal) should be conducted to ascertain that the capture velocity is adequate.

9. The HEPA units shall be checked to evaluate their capture efficiency (DOP test or equal).

MONITORING

1. Every effort shall be made to keep all doses ALARA and less than 100 mrem Cumulative Effective Dose Equivalent (CEDE).

2. Monitoring shall be conducted and consideration of measured levels should be utilized in ALARA procedures review and revision.

3. RCTs shall incorporate radiological hold points into monitoring and evaluation, when appropriate.

4. Waste containers shall be swipe sampled and analyzed, when directed by the RSO, prior to being handled for evaluation or removal from the CA.

5. Unknown waste materials shall not initially be approached by anyone other than an RCT.

6. All containers shall be tagged with the appropriate information which conveys the hazard associated with it (dose rate, isotope, etc.).